DOCUMENT RESUME

ED 474 905 SP 041 467

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TITLE	A Study To Determine the Effect of Skill-Focused Curriculum & Instruction on Student Achievement as Evidenced by GED & ACT Pre/Post Scores.
PUB DATE	2002-12-00
NOTE	84p.; Thesis presented to the Faculty of the Master of Arts Degree Program, Salem International University.
PUB TYPE	Dissertations/Theses - Masters Theses (042) -- Reports - Research (143)
EDRS PRICE	EDRS Price MF01/PC04 Plus Postage.
DESCRIPTORS	*Academic Achievement; Critical Thinking; Delinquency; High Risk Students; Secondary Education; *Skill Development; Teaching Methods; *Thinking Skills
IDENTIFIERS	ACT Assessment; *Incarcerated Youth

ABSTRACT

This study explored the effect of skill-based curricula (based on Bloom's Taxonomy) on the academic performance of incarcerated youth. It investigated the impact of teaching thinking skills as a model for designing curricula at the West Virginia Industrial Home for Youth's Johnston High School, a maximum-security juvenile facility. The Graduate Equivalent Diploma (GED) test and ACT test were used to determine whether this instructional approach would make a positive impact on student achievement. The null hypothesis was that skill-focused instruction would not improve student achievement on standardized tests. Students were scheduled into one of four skill-development sections for each course in their core curricula. These sessions addressed students' skill deficiencies. Two versions of the GED were used in the study (the GED given before 2002 and the 2002 GED). Results rejected the null hypothesis and supported the alternate hypothesis that skill-focused instruction could make a positive impact on student achievement. The ACT test scores also rejected the null hypothesis. (Contains 44 references.) (SM)

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A STUDY TO DETERMINE THE EFFECT OF SKILL-FOCUSED CURRICULUM & INSTRUCTION ON STUDENT ACHIEVEMENT AS EVIDENCED BY GED & ACT PRE/POST SCORES

A Thesis

Presented to

The Faculty of the Master of Arts Degree Program

Salem International University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

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by

Sally Ann Hinterer

December, 2002

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ABSTRACT

The stress placed on teachers and school systems to produce high achieving students has caused controversy in both the choice of curriculum and the method of instruction. School systems are being required to report their standardized tests results for the scrutiny of the public, which adds to the stress of those responsible for the education in the classroom. Not only is the public criticizing its own school systems, but even colleges are reporting that students are entering from high school deficient in basic skills in the areas of reading, math and writing (Nation Still at Risk, 1999). This study focused on the use of skill-focused instruction as an approach to teaching content. The Graduate Equivalent Diploma, or GED, test and the ACT test were used to determine if this instructional approach could make a positive impact on student achievement.

The null hypothesis for this study was that skill-focused instruction would not improve student achievement as evidenced on standardized assessments. The findings in this study reject the null and support the alternative hypothesis that skill-focused instruction can make a positive impact on student achievement. Two versions of the GED test were used, "Prior GED" – given before 2002 and the GED 2002. Based on data analyzed using t tests, the Prior GED reported the composite scores and every subtest, except mathematics, to reject the null hypothesis at the .95 confidence level. Mathematic scores could reject the null

hypothesis at the .90 confidence level, which is still meaningful. The GED 2002 results supported rejecting the null hypothesis for every subtest and composite score. At the .95 confidence level the null hypothesis was again rejected. The ACT test scores were also able to reject the null hypothesis for each sub-area tested and the composite score with the exception of Science. The area of Science was able to reject at the .90 confidence interval, which is still significant.

The variety of tests was used to insure that instruction was the variable tested and not the ability to "teach the test". The results in this study have been obtained through a sampling of juvenile incarcerated youth at a maximum juvenile facility in the state of W.Va. To make gains with this difficult population makes this study even more remarkable.

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This thesis submitted by Sally Ann Hinterer has been approved meeting the research requirements for the Master of Arts Degree.

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This thesis is dedicated to:

My heavenly Father who has
gifted me with the ability to teach…

My husband and sons who
so lovingly have supported me in
my determination to complete the task…

My parents for instilling in me
the courage to believe in my dreams…

My principal who provided me the
opportunity for professional development…

And my students for trusting me
to stretch their minds and to challenge
their 'comfort zones'.

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CHAPTER 1
INTRODUCTION

BACKGROUND

During his 1997 State of the Union Address President, Clinton, made his top priority improving education in America. (The Teacher's Guide to the U.S. Dept. of Education, 2000). Since that time, focus has been placed on insuring that **all** students are to achieve high standards (The Teacher's Guide to the U.S. Dept. of Education, 2000); students who were once taught out of the mainstream have now become part of the global process of education. Juveniles who commit crimes and are incarcerated must be provided an equally challenging education. They, too, must be provided the opportunity to achieve high standards (Employee Handbook of Institutional Education, 2002).

One of the approaches to greater student achievement has been to link knowledge of subject matter to applications in the workplace and life functions (State of the Art: Science, 1993). Specifically for the teacher, s/he no longer becomes the facilitator of all knowledge, but a facilitator who teaches for understanding rather than memorization (State of the Art: Science, 1993). To teach for mastery of the skills necessary to acquire and use the knowledge becomes the focus for the teacher. The curriculum becomes the skills of acquisition, retention, and expression of knowledge using critical thinking skills rather than

simply the recall of facts. (Deshler, 1990) With this being the current mindset of education, the design of instruction for today's classroom teacher might be investigated. In April of 1998, 37 prominent education reformers revisited the 1983 National Commission on Excellence in Education's declaration that the United States is "A Nation Still At Risk" (1999). Not only have our schools not improved in the basic education for all children, but the bureaucratic leaders responsible for reforming the education system are resistant to change unless forced to for their own survival. Students are still graduating high school with less than basic reading skills and colleges have 30% of freshmen needing remedial courses in reading, writing and mathematics. Employers cannot find people to hire that are competent to workplace skills to fill their positions. The nation is still in crisis and re-examination of the classroom teacher, the instruction and curriculum, and the monopolies that big government enjoy needs to be examined for true reform to occur (A Nation Still At Risk, 1999).

STATEMENT OF THE PROBLEM

What is the effect of skill-based curricula upon the G.E.D. scores of incarcerated youth?

HYPOTHESIS

H_0 = Lessons designed to focus on the mastery of skills rather than the memorization of content matter do not improve skills; therefore, assessment results for high-risk students do not show gains.

H_1 = If lessons are designed to focus on the mastery of skills rather than the memorization of content matter, then high-risk students will improve their skills as evidenced on the G.E.D. and ACT standardized assessments.

PURPOSE OF THE STUDY

By investigating the academic approach of teaching skills as a model for designing curricula at Johnston High School, at the West Virginia Industrial Home for Youth, a maximum-security juvenile facility, this study will explore the effect of skill-based curricula on the academic performance of incarcerated youth.

IMPORTANCE OF THE STUDY

If gains in achievement can occur with the difficult populations of the incarcerated setting, then academic gains can be also be reached with the students in the general population by using the same approach.

ASSUMPTIONS

1. The sampling of students was adequate in size.
2. The incarcerated population at the WVIHY is typical of all incarcerated youth.
3. The diagnostician responsible for the data collected during the time of study collected valid and reliable data using standardized testing protocol.
4. The students involved in the study were all taught using the same methods of instruction for approximately the same period of time.
5. All tests used to determine gain/loss are assumed valid and reliable.
6. Skill-focused instruction has not been the uniform method of instruction utilized in the education of the average student before his/her time of incarceration.

LIMITATIONS OF THE STUDY

1. The research was limited to the number of students in each classroom.
2. The study was limited to the length of instructional opportunity as determined by the decisions of each student's court case.
3. The study accepts the existing choices of standardized tests used to determine student achievement and assumes that they are comprehensive enough to make valid conclusions.

DEFINITION OF TERMS*

achieve	to accomplish or finish with success
achievement	realization or accomplishment
assessment	an evaluation or measurement used to determine a student's level of achievement
facilitator	teacher acting as a catalyst for student-centered learning
GED	Graduate Equivalent Diploma
high risk students	students who have been disadvantaged socially, economically, and/or educationally
high standards	goals set as benchmarks to be used to evaluate achievement
incarcerated youth	minors removed from society by court decisions and housed in a secured facility
juveniles	persons defined as minors by the law (ages 10-21 and incarcerated for this study)
skill	an understanding gained by a student that is transferable to a variety of situations
skill deficiency	a weakness in the ability to perform a particular skill

*Definitions are paraphrased from The American Heritage Dictionary of the English Language. Boston: Houghton Mifflin Company, 1980.

CHAPTER 2
REVIEW OF LITERATURE

THE HISTORICAL DEVELOPMENT OF THE K-12 CURRICULUM

The goal of this study is to outline the development of the K-12 curriculum, to express the views and contributions made by the major theorists, and to closely examine the approaches developed to teach critical thinking skills as a major part of the educational curricula.

Development of curriculum is a decision-making process that is never-ending. As curriculum is developed, it becomes a product of its time and is a reflection of the current society. Revisions in curriculum seldom begin or end suddenly. Turney (1990) suggested that at least a decade is needed as a minimum amount of time for basic changes to be made in education. Changes are not made in isolation, but rather changes overlap periods of time. The changes in the people of society effect the changes in curriculum of education. The response to revolutions in social forces, psychological principles, philosophical positions, accumulation of knowledge, and educational leadership guides the development of curriculum (Goodlad, 1966).

Beginning with the examination of education that took place in tribes, a Native American Tribal leader named New-Fist believed that children of the tribe must be taught what is necessary to survive. That is, they must learn things that

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would make them successful at yielding more food, developing better shelter and clothing, and that would help them stay safe and secure. Activities such as fish-grabbing, horse-clubbing and tiger-scaring where part of this early curriculum. As time passed and better tools were developed and civilization became more advanced, these skills were not needed. New-Fist, however, felt that changing what was taught would not be considered education (Pediwell, 1939). The idea that the greatest difficulty in developing new curriculum is the current curriculum itself was the concern in trying to determine the purpose of education (Wooten & Burns, 1997).

As time progressed to the Colonial Era, two common assumptions existed about education. First, the idea of formal education was limited to the needs of only a few people. Most common people were being educated in the home or in apprenticeships and the need for formal education was not necessary for the average citizen. However, in 1647, Massachusetts did pass a law that established Latin grammar schools for the purpose of teaching basic reading and writing skills (Kalman, 1982). Second, the idea of formal education was strictly for the purpose of directing people to an understanding of what an educated person should be. Therefore, the clergy of the time were educated through the Latin grammar schools (Tanner, D. & Tanner, L, 1975). These two assumptions about the purpose of education guided the curriculum of this period of time to be focused on the subject

matter of the eternal truths of the Holy Scriptures. With the scripture being the focus of the curriculum, this meant that the development of the soul and mind were the purpose of educational activities and that the practical activities of life were developed outside the school setting.

One American, however, believed that the nature of society could also serve as a focal point for making decisions about the curriculum. This American was Benjamin Franklin. In 1749, Franklin created the Franklin Academy. This academy emphasized the training in practical subjects as well as physical education, drawing, mechanical arts, mathematics, history, geography, civics, horticulture, science and religion. His ideas foreshadowed the developments of the 19th century view of the purpose of education. By the early years of the 19th century, however, Franklin's ideas became recognized. The idea that formal education was for the purpose of developing the virtues and talents of a "natural aristocracy" and should replace the ruling aristocracy, based on wealth and birth, became prominent (Turney, 1990).

As the nineteenth century progressed, political participation by all Americans became important. As a result, the concept that *all* Americans should be educated started generating attention. In order for people to make sound political decisions they need to be educated. Society also believed that as more urban and industrial development took place that increasing the educational level

of *all* people would help deter crime and other social problems, increase the general wealth, and help all citizens to be able to have an active role in a healthy democracy. Political attention to this focus resulted in more state control of the public schools. In 1852, Massachusetts became the first state to pass compulsory attendance laws. Also, the idea of publicly funded education was initiated during this century (Loeper, 1984).

The next major change in the development of the educational system occurred in 1862. The Land Grant College Act, or the Morrill Act of 1862, impacted higher education in America. This Act was introduced by Congressman Justin Smith Morrill from Vermont. The Act gave each state 30,000 acres of land that was to be sold and the monies used as endowments to provide support for higher education facilities. These institutions focused their attention on educating people in regards to agriculture, home economics, and mechanical arts. The curriculum that was developed as a result of this Act was a curriculum that focused the purpose of education on preparing students for the current world rather than a study of the classical subjects. (Lightcap, 1862).

A new mindset in educational reform occurred during 1892 when the National Education Association (NEA) became more influential. A Committee of Ten was organized during the NEA conference on History, Civil Government, and Political Economy. This committee made recommendations that called for the

focus of instruction to be on the development of critical thinking skills rather than the rote memorization of information. This concept of critical thinking skills as being important foreshadowed movements yet to come in educational reform (Hertzberg, 1988).

With the coming of the twentieth century came clashes in educational philosophy. Traditionalists desired a subject-centered curriculum while non-traditionalists desired a society-centered and individually-centered curriculum. This time period was generally referred to as "The Progressive Era". The schools during this time began to shift their attention to concerns for health, vocation, and the quality of family and community life. Applications of new psychological and social science research were being made in the classroom. The different types of children entering the schools were studied with interest. This time period experienced tension and unrest in the educational realm (National Education Association, 1921). Much of the influence on education during this time was due to the ideas and efforts of John Dewey (1859-1952). Dewey put his theories to practice when he opened the University of Chicago Lab School in 1896. Not only did the results from this institution influence the mindset of education, but two of his students, Harold Rugg and George Counts, published articles in support of Dewey's ideas which gave him even more validity and recognition (Wiles & Bondi, 1998).

In 1921, the Commission on the Reorganization of Secondary Education was formed. The purpose of this organization was to aid American high schools in becoming a better democratic instrument. The organization wanted the American high school to reflect the highest ideals of modern life. An instrument created by the Commission was the "Cardinal Principles of Secondary Education". This document, created in 1918, addressed seven objectives: health, command of fundamental processes, worthy home membership, vocation, citizenship, worthy use of leisure, and ethical character. The purpose of these Principles was to guide the reorganization of secondary education. The Commission also became active in influencing issues on school admission. It focused attention on junior high schools as well as high schools, and it supported the idea of a comprehensive high school (National Education Association, 1921).

A study was initiated in 1930 by the Progressive Education Association to determine how best to meet society's needs and still develop a student who is prepared for college. The study included 30 secondary schools and 300 colleges and universities. At this point in educational reform, the high school curriculum was focused strictly on college preparation and was narrow and rigid. The results of the study found that colleges could find students who could be successful based solely on their interest in education and their ability to read and handle quantitative

data. Unfortunately, these results went relatively unnoticed because of the nation's focus on the war and its recovery efforts (Bruner, 1966).

By the 1960s, curriculum reform was reacting to the subject-centered curricula that resulted from World War II, Sputnik, and the Cold War that emphasized science and technology, and it was learning to balance this focus with society-centered curricula. This balancing of the two approaches became known as the Curriculum Theory (Bruner, 1966). Even though local control still influenced most educational decisions, political conflicts regarding curriculum still existed and had impact (Wirt, 1992).

President Reagan's administration rejected the attempts by the National Science Foundation to influence local curriculum in 1981. However, by 1984, national concern regarding overseas economic competition enabled the Foundation to exercise some influence (Boyd, 1978). The Article "A Nation At Risk" (1999), written by the National Commission on Excellence in Education in 1983, was in response to the Russians ability to launch the space satellite "Sputnik" before the United States was able to do such an act. The recognition that other nations were more advanced brought focus and attention to the poor state of the nation's school programs, especially to the fields of mathematics and science. Great initiatives were started to better prepare students for the competition of a global society. Since this time period, reform has not been initiated from crises, but rather it has

been initiated through government and foundation grants. The curriculum changes now have self-starting ability (Boyd, 1978). Even so, the 37 prominent education reformers who wrote "A Nation Still At Risk" (1999) find the current state of the nation's education system pathetic; they blame the monopolies in positions of decision-making to be too comfortable to initiate necessary changes. They find it repulsive to be the only country in the world whose students seem to fall farther behind the longer they stay in school. A call to reform by starting with those in positions of power is being made in an effort to make real revisions, not just empty words that are not carried down to impact the classroom.

Today, decision-making for curricula development involves the federal government, textbook publishers, professional associations, university professors and local level publics. An attempt on the part of these entities to create a workable curriculum that benefits all students is one of education's most challenging tasks.

THE CONTRIBUTIONS OF MAJOR THEORISTS TO CURRICULUM DEVELOPMENT

The Society for the Professors of Curriculum brainstormed which curricularists were the most influential in the development of the curriculum theory in America since the beginning of the 20th century. As a result, an impressive list

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of 80 theorists was generated. A survey leading from this list asked for the five theorists who most influenced curriculum development. The responses recognized John Dewey, Ralph Tyler, Hilda Taba and Franklin Bobbitt as being theorists who had great impact on educational reform (Hayes, 1991).

John Dewey was a philosopher and educator who focused his attention on pragmatism, or "learning by doing". Dewey did not believe that a student should memorize large quantities of information, but that intelligence is acquired and should be developed by helping students to become problem-solvers. Dewey also did not believe that education should exclude the socialization of a child and his/her corresponding personal growth. From these philosophical views came his educational goals:

- to socialize the young (thereby transforming both the young and society), and
- to develop the individual in all his or her physical, mental, moral and emotional capacities (Oliva, 1982).

In 1896, Dewey's ideas were implemented at the University of Chicago's Experimental School. In using Dewey's curriculum, learners were set free of the confines of subject-centered curriculum and were encouraged to be creative in an environment that was geared to their needs and interests. The findings observed

from this experience were that Dewey's curriculum was based on four human impulses, which Dewey referred to as "uninvested capital":

> ...the social impulse, which is shown in the child's desire to share his experiences with the people around him; the constrictive impulse, which is manifested at first in play, in rhythmic movement, in make-believe, and then in more advanced form in the shaping of raw materials into useful objects; the impulse to investigate and experiment, to find out things, as revealed in the tendency of the child to do things just to see what will happen; and the expressive or artistic impulse, which seems to be a refinement and further expression of the communicative and constructive interests. (Smith, Stanley, and Shores, 1957)

Even though Dewey was concerned with the rights of students to be involved in decisions affecting their own education, he was equally concerned with the rights of teachers. This concern for teachers led Dewey to membership in the first teacher's union in New York City, and to be active in the creation of the American Association of University Professors. All of Dewey's influences, however, lost impact during the second half of the twentieth century when his work "fell out of fashion". It was not until recently that his ideas were revisited. (Dewey, 1990)

Another educational philosopher who had a major impact on shaping the American educational system was Ralph W. Tyler. Tyler developed a systematic framework for designing curriculum that centers on selecting and organizing objectives, content and activities, and on evaluating learning. This framework has come to be referred to as the Tyler Rationale and has been recognized as creating the field of educational evaluation. This has had a dramatic effect on the lives of generations of students whose performance and potential are subject to assessment.

The most noted work of Ralph Tyler is his idea of creating general objectives to guide the educational process. Tyler believed that these objectives must be generated from three sources: the learners, extracurricular activities, and the subject matter itself. After general objectives were defined, they must then be filtered through two screens: the educational and social philosophy of the school and the psychology of learning. The educational and social philosophy of the school in this screen refers to the common values and beliefs as outlined by the teachers. This respect of the views of the teachers creates the school to be a dynamic, living entity with a collaborative emphasis. The psychological screen refers to the child growth and development process as well as the basic understanding of the learning process. With these two filters in place, the resulting objectives become instructional classroom objectives that are clearly stated in behavioral terms (Tyler, 1949).

To summarize Tyler's rationale in developing curriculum, he developed four basic questions that should be addressed when deliberating instructional objectives:

- What educational purposes should the school seek to attain?
- How can learning experiences be selected which are likely to be useful in attaining these objectives?
- How can learning experiences be organized for effective instruction?
- How can the effectiveness of learning experiences be evaluated?

Criticism of Tyler's work was made vocal by Daniel and Laurel Tanner. Their major concern regarding Tyler's Rationale was that is seemed value-neutral and that it did not show the interaction or interdependence of the learner, life outside the school, and the subject matter. The Tanners were concerned that this separated view might cause curriculum development to become too mechanical and lead to intelligent people, but with little regard to the development of a good human being or a just society (Tanner, 1975).

Hilda Taba conducted research on developing higher levels of thinking during the 1950's and 1960's. Her research was funded through the Federal Department of Education Research Project and was performed at San Francisco State College (Erickson, 1995). Taba expressed concern that the design of curriculum should be decided upon by teachers rather than be dictated by bureaucrats. She viewed curriculum as a "plan for learning". She further

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identified curriculum by listing its elements: statements of aims and of specific objectives, certain patterns of learning and teaching as demanded by the content or the organization required by it, and a program to evaluate the outcomes (Taba, 1962).

Results of her research study, that utilized a concept-based social studies curriculum, led Taba to conclude that cognitive maps were critical in facilitating the cognitive development of the child. These "cognitive maps" were levels of understanding in regards to the content as well as the critical thinking processes involved in learning. The study also led Taba to the conclusion that teachers are often hindered because of the pressure to "cover the curriculum". However, assessment results showed that time spent on the teaching and learning process did not hinder strong achievement in mastering the fact-based information (Taba, 1966). Taba's grass-roots philosophy supported the idea that a person's understanding of a concept grows as s/he develops the ability to understand increasing complex, conceptual examples. She, therefore, proposed that content coverage be focused on generalizations and main ideas, as understood by the learners, to lead the direction and depth for instruction. She also supported the view that learning has multiple objectives that require different forms of instruction that vary in complexity (Taba, 1966).

To summarize Taba's inductive approach to curriculum change, listed below is her five-step sequence for accomplishing curriculum change:

1. The creation by teachers of teaching-learning units that are designed for a particular grade level or teaching area that are to be used as pilots. This requires a diagnosis of the needs, formulation of objectives, selection of content, organization of the content, selection of learning experiences, organization of learning activities, and a determination of what to evaluate and of the ways and means of accomplishing this, checking for balance and sequence.
2. The testing of these experimental units.
3. The revision and consolidation of the experimental units.
4. The development of a working framework.
5. The installation and dissemination of the new units (Taba, 1966).

An educational philosopher who became recognized for his development of the modern concept of "objective analysis" was Franklin Bobbitt. This concept became the forerunner of job and task analysis. "Education is a shaping process as much as the manufacture of steel rails" (Bobbitt, 1918). This quote by Bobbitt expresses his view of the purpose of education. Bobbitt believed that schools should examine the activities necessary to be productive and functional in society and use these as outcomes to be the end results of the educational experience. He

believed an objective analysis of the skills necessary for successful living should determine the goals of the academic experience. This concept of making a connection between outcomes and instruction was endorsed by Bobbitt (Bobbitt, 1918).

Another contribution of Bobbitt to the educational reform was the recognition of curriculum-design as a distinct field of study. He acknowledged the use of scientific methodology in curriculum development, citing the application of measurement and evaluation techniques, diagnosis of problems, and prescription of remedies as important in the design process (Bobbitt, 1918). His contributions are still utilized today; teaching objectives are still an integral part of the K-12 classroom today as well as curriculum design being a major facet of educators and society.

PHILOSOPHIES THAT HAVE INFLUENCED EDUCATION REFORM

Four major philosophies of education have emerged over the history of educational design/reform, but only two have impacted schools with any significance (Oliva, 1982). The four themes include reconstructionism (the most liberal philosophy), progressivism, essentialism, and perennialism (the most conservative). The two that have been most recognized as influential are the philosophies of essentialism and progressivism (Venable, 1967).

The philosophy of reconstructionism focuses on the idea that the school has the responsibility of transmitting cultural heritage and/or studying social issues, and that it must become an agency for solving political and social problems. This is an extension of the views earlier expressed by John Dewey who saw the school in both psychological and social terms; the reconstructionists believed societal improvements should be the focus of schools (Venable, 1967).

American schools have not experienced major influences from the views of reconstructionism. Theodore Brameld described the ideals of this philosophy as: sufficient nourishment, adequate dress, shelter and privacy, sexual expression, physiological and mental health, steady work and income, companionship and a sense of belonging, recognition, curiosity and adventure, literacy, participation, and order and direction (Brameld, 1950).

The perennialist perspective is one that views the purpose of education as the disciplining of the mind, the development of the ability to reason, and the pursuit of truth. This viewpoint supports the belief that truth is eternal, everlasting and unchanging. A prominent perennialist is the former president of the University of Chicago, Robert M. Hutchins. He believes that an ideal education is not an ad hoc education, not an education directed to immediate needs; he believes that is not a specialized education, or a pre-professional education; it is not utilitarian education. Instead, Hutchins (1963) believes that the ideal education is an

education calculated to develop the mind. In general, the perennialist looks backwards for the answers to social problems. S/he focuses the attention of instruction to meet the immediate needs of the learner, specializing the education to his/her needs, and gives attention to vocational training.

Preserving cultural heritage is the aim of essentialism. The essentialist attempts to adjust individuals to the current society. The teaching of the 3 R's and the academic subjects are the basis of the curriculum designed under the influence of this philosophy. Educators who teach from this philosophical viewpoint tend to tailor the child to the curriculum and perceive education as the preparation for some future purpose (Venable, 1967).

Today, a "return to the basics" is being addressed. This is derived from the essentialist's view, which is congruent with many of the behaviorist's views. The behaviorist believes the learner is in a passive role with regard to a stimulus. The behaviorist-essentialist approach to the classroom sees the curriculum as being designed in logical, sequential steps. Instruction of the material usually begins with the presentation of a rule, concept or model. This presentation is then followed with multiple examples of how the rule, concept or model can be applied. It is believed that with enough practice opportunities, the learner can master the content as a result of application activities; therefore, information can be easily retrieved (Bagley, 1938).

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The skill-focused instruction utilized in this study has its foundation in progressivism. Progressivists believe that the content should be tailored to the child not vice versa. They also believe that democracy is crucial to the classroom and society, and it must always be upheld.

An Authoritarian attitude is not acceptable in the classroom in this philosophy. Individual differences among students are recognized and viewed as important; teachers view themselves as facilitators of the learning process, rather than the giver of all knowledge. The disadvantage to this philosophy is the difficulty that it presents in trying to provide for and evaluate individualized curriculum; however, its contributions to the classroom have been valuable regardless of its negative aspects (Oliva, 1982).

THE DEVELOPMENT OF CRITICAL THINKING SKILLS

As noted in Chapter One, President Clinton made his top priority improving education in America; this was stated in his State of the Union Address in 1997. In response to his concern, the U.S. Department of Education began implementing several new initiatives to enhance student achievement (U.S. Department of Education: A Teacher's Guide, 2000). Student achievement, however, is a direct result of classroom instruction; therefore, the role of the teacher/learner and the

methods of instruction had to be examined as well to determine how to make gains in student achievement (State of the Art: Science, 1993).

A logical question is: Why be concerned with assessment results and how those assessments were designed? Is it not enough for a student to graduate from the classroom with a basic knowledge of a predetermined set of facts? John Newman stated, "Knowledge is a something and does a something" (Evans, 1999). When teachers design assessments to test the content that has been presented, evidence shows a misalignment between the thinking levels of the test questions to those of the lessons prior to the test. When the critical thinking approach is being taught through a hands-on approach to problem-solving or inquiry, the assessment given to students is often rote memory, knowledge level questions. In reverse, the content is often delivered as information to be memorized, but it is tested at a much higher level. This misalignment is frustrating to students and teachers as well as a condition that can lead to failure (Evans, 1999;Ball & Washburn, 2001). The student being prepared by the educational system of the twenty-first century cannot be successful in the workplace without critical thinking skills that will enable problem-solving and evaluative reasoning (Hirose, 2000). With the workplace being more high-tech than ever before, students must become masters of critical thinking skills to be able to successfully engage in the workforce. This means the instruction in the classroom along with the assessments used to determine students'

academic achievement must also be aligned to focus on critical thinking skills (Evans, 1999).

What are critical thinking skills? Shannon Hirose has investigated critical thinking skills in her review of numerous investigative studies. She sites the opinions and findings of several authors:

- Cromwell stated that the definition of critical thinking has gone through a transformation form meaning the ability to distinguish the thought patterns in the work of others to a reflection on one's own beliefs, thoughts, and decision.
- Nicherson, Perkins, and Smith define it as figuring out what to believe, in a variety of contexts, "in a rational way that requires the ability to judge the plausibility of specific assertions, to weigh evidence, to assess the logical soundness of inferences, to construct counter arguments and alternative hypotheses."
- Paul defines critical thinking as "disciplined, self-directed thinking that exemplifies the perfections of thinking appropriate to a particular mode or domain of thought."
- Glock offers the following broad definition: "Critical thinking skills are (a) those diverse cognitive processes and associated attitudes, (b) critical to

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intelligent action, (c) in diverse situations and fields, (d) that a can be improved by instruction or conscious effort" (Hirose, 2000).

The commonality in the views of these researchers is the recognition that information needs to be used to derive meaningful and that problem-solving requires critical thinking skills.

In developing the skills of critical thinking, the teacher can no longer stand in front of the classroom, recite facts and information, and allow students to passively exist in their seats (Barrickman, 1997). Teachers must now view themselves as the facilitators of the learning process and design curriculum, as well as their instructional strategies, to challenge the students to higher-order thinking. Students need to be encouraged to participate as active learners by questioning information and by developing a logical approach to problem-solving (Barrickman, 1997). Being able to apply information to a domain of thought must become the focus rather than just the recall of the information. Engaging students in activities that teach them to apply, analyze, synthesize, and evaluate information becomes the focus of all instruction. (Hirose, 2000;Campbell, 1996)

Benjamin Bloom developed a hierarchy for cognitive development that has been taught in the teacher preparation program in most colleges and universities (Wiles & Bondi, 1998). However, it often has been a memorized concept that was regurgitated on a test and then abandoned, than an approach to learning that was

developed into an instructional practice; researchers found over 80% of questions used in the classroom to be at the knowledge level of Bloom's Taxonomy rather than at a critical thinking level (Barrickman, 1997). Bloom theorized that learning takes place through a systematic process that he termed Bloom's Taxonomy for the Development of the Cognitive Domain.

Bloom believed that if a systematic approach from basic understanding to critical thinking was used to develop a concept or idea, then the student would have ownership of the information and would have developed a set of skills to use that information (Bloom, 1956).

A study conducted by professors at Baptist Bible College during the periods of September 1997 – January 1998 revealed that designing curriculum based on Bloom's Taxonomy was beneficial in helping students gain higher-order thinking skills. The study reinforced the idea that if lessons are designed to encourage students by using the steps of Bloom's Taxonomy for the development of questions and reasoning skills then they would perform better on assessments that test for critical thinking skills (Evans, 1999).

Much focus has been placed on the education of students who are not typical of the mainstream population. This attention has forced educators to be creative in designing lessons to address the special needs of all the students in their classroom. As students move from elementary grades where basic skills are the focus, to the

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secondary grades where content is emphasized, many students begin to obviously struggle. The demands of the secondary classroom include the expectation that the student can read textbooks independently, take notes from lectures, work independently, and express knowledge of a particular topic through written compositions. All of these demands require that basic skills be a solid foundation and that critical thinking skills are being developed (Boudah & O'Neill, 2000). The classroom teacher must make pointed instruction to insure that these advanced skills are being developed rather than just assuming that they will develop along with the understanding of the content. By using Bloom's Taxonomy as a curriculum guide, students are never left behind or set up for failure because it is a systematic approach to meeting the needs of the students (Ball & Washburn, 2001).

When using Bloom's Taxonomy as an academic guide, educators are able to prepare students to think through difficult situations when they are not able to be with them to help them. Even though Bloom's approach to cognitive learning is being revived in the design of curriculum and instruction, it is often overlooked in the design of assessment (Ball & Washburn, 2001). Often students are asked to do an activity in class that requires an application of the content. However, when they are assessed, the assessment tool often requires only a recall of important facts and

is limited in the number of higher-order thinking questions it asks. This poor alignment must be examined and corrected (Ball & Washburn, 2001).

In summary, this study attempts to reflect on the history of the development of the K-12 curriculum and the contributions of major theorists to educational practices. It also highlights the prominent philosophies that have shaped education. Finally, this study attempts to examine critical thinking skills as they apply to the classroom and to the workforce. An emphasis is placed on understanding Bloom's Taxonomy as theory put into instructional practice is the systematic approach to developing critical thinking skills.

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CHAPTER 3
METHODS

PARTICIPANTS

The West Virginia Industrial Home for Youth, W.Va.'s only maximum-security juvenile facility, utilizes Johnston High School as the academic program for its resident population. The population at the facility is continually fluctuating as new students enter the school system every Thursday and students leave in random fashion as their courts determine. On any given day the total population is an average of 125 residents. The majority of the population is male with a ratio on average of 1:5 females to males.

The residents are given a battery of academic assessments to determine their current level of academic skills upon arriving at the facility. The results of this battery always show a major deficiency in basic reading and math skills with 85%-96% of the students during the time of this study reading below a sixth grade reading level. This is significant since the average age of the population studied is seventeen and the average grade level is tenth grade. Scheduling of students into one of four skill-development sections for each course in their core curricula occurs so pointed instruction can address the skill-deficiencies. Teacher-made, informal, assessments are given throughout their scholastic program to

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check for improvement in their academic skills. Once the instructors in each of the core curricular areas make the determination that the student has remediated any skill deficiencies and has acquired the necessary academic skills to be prepared for the formal GED, the diagnostician will arrange for the standardized test to be administered under proper protocol. The data from the Pre-GED and Post-GED assessments will be utilized for this study. The same procedure is followed for the ACT exam. The study will examine data from assessments given during the time of Sept 1, 1998 to September 1, 2002, and it will only include the students who were at Johnston High School for both the pre and post exams for each test.

MATERIALS

The resources that will be utilized in conducting this research will be the Pre-GED and GED assessments. The methods of instruction will be those designed under the program developed at the WVIHY by the academic professionals. All teachers at Johnston High School have attended extensive staff-development regarding the application of skill-focused instruction. Bloom's taxonomy will be implemented as a guide to this instructional practice as the basis for this instructional approach. All lessons, instructions, and assessments will be developed through the implementation

of Bloom's Taxonomy. Test item analyses will be performed on all assessments for the purpose of curricular decisions-making.

PROCEDURES

When residents enter the facility, a battery of tests will be given to determine their current skill-level. This battery includes the EBSCO, Woodcock Johnson III, Revised, the Pre-GED and the Pre-ACT. In review of these assessment results, the students will be placed in one of four levels of classes with each level being designed to address a specific level of skill deficiencies. Different teachers will be involved in educating each student throughout a nine period instructional day. Each teacher will be trained and competent in creating and utilizing skill-focused instruction in their respective curriculum. When the teacher/s determine that the skill-deficiencies have been corrected, the students will be given the G.E.D. assessment. The pre/post test scores will then be complied for analytical review. This same method will be followed for the ACT scores.

DATA ANALYSIS

The results of these pre/post assessments will be analyzed using t-tests to determine if gains where made in skills for each of the core curricular

areas of writing, reading, mathematics, social studies, and science. The composite test results will also be compared. The results will be graphed and reported. Because the GED test was revised starting January 1, 2002, the data will be separated to show results on the former GED and the newest version of the GED. The purpose of reporting the data separately is to reinforce the concept behind the concept that skill-focused instruction can improve students' academic skills as evidenced on **any** standardized skill assessment. This is also the reason for including data on the ACT assessments.

CHAPTER 4
ANALYSIS OF DATA

INTRODUCTION

The purpose of this study was to determine the effect of skill-focused instruction based on Bloom's Taxonomy on student achievement. The study was designed to compare the pre-test results of students entering the incarcerated academic setting to the post-test scores of those same students. The tests used for this measurement were the Pre-GED and final GED and the Pre-ACT and the final ACT. Each of the five subtests in the GED, the four subtests on the ACT and the composite scores for each test was compared using *t* tests.

Starting January 1, 2002, the *GED 2002* test was implemented and it replaced the GED test used prior to this date, which will now be referred to as the "Prior GED". This study compared pre/post test data in three sets: the Prior GED, the GED 2002, and the ACT. The null hypothesis was that skill-focused instruction would not affect the outcome of student achievement as evidenced on standardized tests.

STATISTICAL DATA

PRIOR GED RESULTS

The mean was calculated for each raw score of the subtests and the composite scores for the twenty students used in the sample. The mean on the posttests were

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greater than the pre-test scores in each comparison. The results are shown in Table 1.

Table 1

COMPARISON OF PRE/POST TEST MEAN RESULTS PRIOR GED						
	WRITING	SOCIAL STUDIES	SCIENCE	LITERATURE & ARTS	MATH	COMPOSITE
PRE	39.3	46	46	46	47	45
POST	50.6	54	54	53	51	52
GAIN	+11.3	+8	+8	+7	+4	+7

A *t* test was performed for each of the subtests and the composite scores. The degree of freedom was 19 and the critical t-value was determined to be 2.093; the results were calculated at the .05 level of confidence. These values were used to evaluate each of the subtests in the Prior GED study. The first subtest of the Prior GED examined was the Writing Subtest. See Table 2.

Table 2

PRIOR GED WRITING SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Writing	39	51	+12	2.093 (0.95CI)	6.585	Reject

The test statistic was calculated to be 6.585 which is greater than the critical statistic of 2.093 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 11.3 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

The second subtest that was analyzed was the Literature and Arts subtest. See Table 3.

Table 3

PRIOR GED LITERATURE & ARTS SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Literature & Arts	46	53	+7	2.093	5.690	Reject

In this subtest, the test statistic was calculated to be 5.690 which is greater than the critical statistic of 2.093 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 7 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

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The third subtest that was analyzed was the Social Studies subtest. See Table 4.

Table 4

PRIOR GED SOCIAL STUDIES SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Social Studies	46	54	+8	2.093	4.672	Reject

In this subtest, the test statistic was calculated to be 4.672 which is greater than the critical statistic of 2.093 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 8 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted. The fourth subtest that was analyzed was the Science subtest. See Table 5.

Table 5

PRIOR GED SCIENCE SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Science	46	54	+8	2.093	3.584	Reject

The same calculations were made for the Science subtest; the test statistic was calculated to be 3.584 which is greater than the critical statistic of 2.093 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 8 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

The fifth subtest that was analyzed was the Mathematics subtest. See Table 6.

Table 6

PRIOR GED MATHEMATICS SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Mathematics	47	51	+4	2.093 (.95 CI)	2.020	Accept
				1.725 (.90 CI)	2.020	Reject

For the mathematics subtest, the test statistic was calculated to be 2.020 which is less than the critical statistic of 2.093 at the 0.95 confidence interval. However, the test statistic is greater than the critical statistic of 1.725 at the .90 confidence level. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance only at a

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lower level of confidence compared to the other subtests. The scores also revealed a gain of 7 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be accepted at the .95 confidence level, but rejected at the .90 confidence level. The alternative hypothesis can only be accepted at the .90 confidence level for this subtest.

The final subtest that was analyzed was the Composite subtest. See Table 7.

Table 7

PRIOR GED COMPOSITE						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Composite	45	52	+7	2.093	4.815	Reject

In this final subtest, the test statistic was calculated to be 4.815 which is greater than the critical statistic of 2.093 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 7 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

GED 2002 RESULTS

The next standardized test analyzed in this study was the GED 2002. Table 8 shows the comparison of each of the subtests.

Table 8

COMPARISON OF PRE/POST TEST MEAN RESULTS PRIOR GED						
	WRITING	SOCIAL STUDIES	SCIENCE	LITERATURE & ARTS	MATH	COMPOSITE
PRE	378	471	459	488	489	467
POST	498	542	548	543	512	531
GAIN	101	71	79	55	23	64

The mean was calculated for each raw score of the subtests and the composite scores for the seventeen students used in the sample. The mean on the posttests were greater than the pre-test scores in each comparison. A *t* test was performed for each of the subtests and the composite scores. The degree of freedom was 16 and the critical t-value was determined to be 2.120; the results were calculated at the .05 level of confidence. These values were used to evaluate each of the subtests in the GED 2002 study. The first subtest of the GED 2002 examined was the Writing Subtest. See Table 9.

Table 9

GED 2002 WRITING SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Writing	378	498	+101	2.120	5.422	Reject

The test statistic was calculated to be 5.422 which is greater than the critical statistic of 2.120 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 101 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

The second subtest for the GED 2002 that was analyzed was the Literature and Arts subtest. See Table 10.

Table 10

GED 2002 LITERATURE & ARTS SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Literature & Arts	488	543	+55	2.120	2.924	Reject

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The test statistic was calculated to be 2.924 which is greater than the critical statistic of 2.120 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 55 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

The third subtest that was analyzed was the Social Studies subtest. See Table 11.

Table 11

GED 2002 SOCIAL STUDIES SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Social Studies	471	542	+75	2.120	4.232	Reject

The test statistic was calculated to be 4.232 which is greater than the critical statistic of 2.120 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 75 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

The fourth subtest that was analyzed was the Science subtest. See Table 12.

Table 12

GED 2002 SCIENCE SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Science	459	548	+79	2.120	4.200	Reject

The test statistic was calculated to be 4.200 which is greater than the critical statistic of 2.093 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 79 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

Mathematics was the fifth subtest that was analyzed. See Table 13.

Table 13

GED 2002 MATHEMATICS SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Mathematics	489	512	+23	2.120	2.143	Reject

The test statistic was calculated to be 2.143 which is greater than the critical statistic of 2.120 at the 0.95 confidence interval. Therefore, the test revealed a

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statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 23 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

The final subsection at was analyzed was the Composite scores. See Table 14.

Table 14

GED 2002 COMPOSITE						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Composite	467	531	+64	2.120	7.328	Reject

The test statistic was calculated to be 7.328 which is greater than the critical statistic of 2.120 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 64 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

ACT RESULTS

The same method of analysis was performed on the pre/post scores for the ACT test. The mean was calculated for each raw score of the subtests and the composite scores for the twenty-seven students used in the sample. The mean on the posttests were greater than the pre-test scores in each comparison. The results are shown in Table 15.

Table 15

COMPARISON OF PRE/POST TEST MEAN RESULTS ACT					
	ENGLISH	MATHEMATICS	READING	SCIENCE	COMPOSITE
PRE	15	15	18	18	17
POST	19	18	20	19	19
GAIN	+4	+3	+2	+1	+2

A *t* test was performed for each of the subtests and the composite scores. The degree of freedom was 26 and the critical t-value was determined to be 2.056; the results were calculated at the .95 level of confidence. However, at the .90 level of confidence, the critical t-value was determined to be 1.706. These values were used to evaluate each of the subtests in the ACT study. The first subtest of the ACT examined was the English Subtest. See Table 16.

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Table 16

ACT ENGLISH SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
English	15	19	+4	2.056	3.899	Reject

The test statistic was calculated to be 3.899 which is greater than the critical statistic of 2.056 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 4 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

Mathematics was the next subtest analyzed. See Table 17.

Table 17

ACT MATHEMATICS SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Mathematics	15	18	+3	2.056	2.545	Reject

The test statistic was calculated to be 2.545 which is greater than the critical statistic of 2.056 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved

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academic performance. The scores also revealed a gain of 3 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

Reading was the third subtest that was analyzed. See Table 18.

Table 18

ACT READING SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Reading	18	20	+2	2.056	3.410	Reject

The test statistic was calculated to be 3.410 which is greater than the critical statistic of 2.056 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 2 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

Science was the last subtest analyzed. See Table 19.

Table 19

ACT SCIENCE SUBTEST						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Science	18	19	+1	2.056 (.95 CI)	1.892	Accept
				1.706 (.90 CI)	1.892	Reject

For the science subtest, the test statistic was calculated to be 1.892 which is less than the critical statistic of 2.056 at the 0.95 confidence interval. However, the test statistic is greater than the critical statistic of 1.706 at the .90 confidence level. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance only at a lower level of confidence than the other subtests. The scores also revealed a gain of 1 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be accepted at the .95 confidence level, but rejected at the .90 confidence level. The alternative hypothesis can only be accepted at the .90 confidence level for this subtest.

The final analysis of the ACT scores was performed on the Composite values. See Table 20.

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Table 20

ACT COMPOSITE						
	Pre-mean value	Post-mean value	Gain/Loss	Critical t value	Test t value	Accept/Reject Null Hypothesis
Composite	17	19	+2	2.056	6.089	Reject

The test statistic was calculated to be 6.089 which is greater than the critical statistic of 2.056 at the 0.95 confidence interval. Therefore, the test revealed a statistical significance as the students' scores on the posttest did show improved academic performance. The scores also revealed a gain of 2 between the pre-mean and the post-mean upon analysis. These results require the null hypothesis to be rejected and the alternative hypothesis to be accepted.

CHAPTER 5
SUMMARY

SUMMARY OF RESULTS AND CONCLUSIONS

Statistical evidence is present to support the alternative hypothesis that skill-focused instruction can improved scores on all three of the standardized tests used in this study. Specifically, the alternative hypothesis was accepted and the null hypothesis rejected for the Prior GED at the .95 confidence interval for every subtest except Mathematics. However, Mathematics does show evidence to reject the null hypothesis at the .90 confidence interval causing the alternative hypothesis to be accepted.

Statistical evidence in the study using the GED 2002 assessment demonstrated again, a rejection of the null hypothesis and the acceptance of the alternative hypothesis. The test statistics calculated for each of the subtests in this sampling: Writing, Social Studies, Science, Literature & Arts, and Mathematics, all exceeded the critical scores thereby causing the null hypothesis to be rejected. The composite score also had a test statistic that exceeded the critical statistic; thus, the null hypothesis was again rejected.

The GED tests, both the Prior GED and the GED 2002, are written at approximately the tenth grade reading level and assess the full realm of skills as defined by Benjamin Bloom in his taxonomy (The GED Testing Service, 2002).

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Initial assessments given to the students used in the samplings for this study concluded that approximately 90% of the students were reading below the sixth grade reading level upon entering the incarcerated setting. Since the average stay for a resident/student in the incarcerated setting is approximately 6-8 months, to improve their skills to pass a test designed at a tenth grade reading level is a difficult task. Skill gaps compound as time passes and for many students, these skill gaps are severe (Barrickman, 1997). The evidence provided in this study supports the hypothesis that skill-focused instruction can have a positive impact on student achievement.

The ACT test statistics provided evidence to reject the null hypothesis at the .90 confidence interval for all subtests and the composite. However, every area except science showed evidence to reject the null hypothesis at the .95 confidence interval as well. Science was the only area in the ACT study that did not have a test statistic that exceeded the critical statistic at the .95 confidence interval. The ACT is designed to return the same score for a student unless interventions are made to improve academic skills. Statistics from high schools across the state support this conclusion (The Teacher's Guide to the U.S. Dept. of Education, 2000). By the statistical evidence provided in this study, skill-focused instruction is a method of intervention that is effective.

The results of this study indicate that skill-focused instruction can be a powerful tool in helping students to improve in academic skills. It is important to remember that the entrance assessment data on the student sampling support the assumption in this study that skill-focused instruction is not the method of instruction in the typical public school setting. It is this assumption that is of importance because any level of instruction should show evidence of academic gains, yet 36% of high school graduates are required to attend remediation classes during the first year of college because of poor academic skills. The public school often defines academic success by calculating a grade point average which often does not reflect strictly academic competencies, but participation, notebooks, group work, etc. (Biller, 2002). These factors help to draw the conclusion that skill-focused instruction is not commonplace in the classroom experience of the average student.

Today's society is fast-paced and ever-changing. In this age of information the facts that were taught yesterday are being found out-dated or revised today, often at an overwhelming rate (NASA, 2002). If students are to be expected to actively engage in society then the school system must be responsible to make them independent learners who are true problem solvers. Only in being taught to think critically and not just be made to memorize and regurgitate information will students gain these vital skills. The challenge for curriculum designers is to

balance the depth and breadth of curricula in a way that stimulates the cognitive development of all students (Barrickman, 1997).

Many corporations in today's job market are requiring basic skills assessments as a pre-requisite to an interview. Helping students to gain the skills necessary to excel on these tests must be a concern for the school system. Industry is looking for people who are able to perform basic academic skills with good proficiency; it is too costly for industry to have to train their employees in these basic areas. If students are taught problem-solving and content knowledge using a skill-focused approach based on Bloom's Taxonomy then they will have a stable foundation on which to enter the workforce (Hirose, 2000).

When educators try to meet the challenges of rigorous state and national standards, mandates, and policies, it is often overwhelming for the teacher to try to "cover it all" with any sense of creativity or accomplishment. This sense of urgency to cover a large amount of information often results in rote memory style lessons because they are easier to develop and assess. When Bloom's Taxonomy is used to develop the content, the skills of acquisition, retention, and expression of knowledge are arranged in a systematic hierarchy that allows for the students to be successful as critical thinkers and to function as independent learners. Too often, educators feel that they are the giver of all knowledge. Today's technological society is gaining new knowledge at a rate far greater than any one person can keep

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up with; therefore, educators must recognize the necessity of creating each student to be an independent learner. Each student must be able to enter society ready to understand new information as it is revealed, derive meaning from this information, understand any implications/applications that it might have in their life, and be able to evaluate the greater realm of this information on society. Only when students can make this independent leap into society with critical thinking skills will they become valuable contributors to the world (Barrickman, 1997).

The difficulty in teaching educational agencies to implement skill-focused education based on Bloom's Taxonomy is that it is not a pre-packaged program that starts at a set point beginning and chronologically followed until an end point. Implementing this instructional approach requires analytic skills on the part of the instructor. It also requires an understanding of Bloom's Taxonomy in each of the academic disciplines. Life does not separate the skills of reading, writing and doing mathematics, so why does the classroom teacher often teach pointedly only at one curricular area? For example, shopping requires the writing of a list, organizational skills, check-writing skills, the reading of food/clothing labels and directional signs on highways and in stores. It also requires the use of mathematical skills to balance a checkbook and determine if the purchase can be made financially. The classroom must be a setting where all academic disciplines are taught simultaneously just as life requires the use of skills simultaneously (Ball & Washburn, 2001).

In conclusion, skill-focused instruction can make a positive impact on student achievement. Repeating this study on the SAT-9 test or the new test being currently developed to replace the SAT-9 would further reinforce the benefit of using skill-focused instruction as a tool that will help students improve academic performance. At the collegiate level, the study could be applied to the PRAXIS test to determine if the collegiate population could also benefit from this type of instruction.

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APPENDIX A

State of West Virginia

DIVISION OF JUVENILE SERVICES

Bob Wise
Governor
Joe Martin
Cabinet Secretary
Manfred G. Holland
Director

West Virginia Industrial Home for Youth
7 Industrial Boulevard Industrial, WV 26375
304.782.2371 304.782.4285 fax

Alvin Ross
Facility Superintendent

August 6, 2002

Sally Hinterer
Route 1, Box 79
New Milton, WV 22411

Dear Ms. Hinterer:

I am in receipt of your request to conduct research for a thesis utilizing the students at the West Virginia Industrial Home for Youth. Confidentially is of paramount importance. Please check with Johnson School Principal, Robert Daquilante, concerning education standards.

Confidentially Standards for the Division of Juvenile Services are attached. Please review P.D. 4.01 and sign the attached confidentially statement. This will advise you of expected standards and allow you parameters to work within. If you agree to these precautions, then you may proceed as requested.

Respectfully Submitted,

Alvin D. Ross
Superintendent

ADR/cp

Attachment: PD 4.01 pages 10-11 and Confidentiality Statement

cc: Robert Daquilante, Principal
Correspondence File

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APPENDIX A

B. Class B Offenses

First Offense - Five (5) day to fifteen (15) day suspension.

Second Offense - Sixteen (16) day suspension to a thirty (30) day suspension.

Third Offense - Thirty-One (31) day suspension to dismissal.

B1. Unauthorized absence of one (1) to three (3) days.

B2. Failure or delay in following a supervisor's instructions, performing assigned work or otherwise complying with applicable established written policy or procedures.

B3. Violating safety rules where there is no threat to life.

B4. Careless workmanship or negligence resulting in spoilage or waste of materials or delay in work production.

B5. Leaving the work site without permission during working hours.

B6. Failure to observe precautions or personal safety; posted rules; facility staff notices; signs; written or oral safety instructions; or failure to use protective clothing and equipment.

B7. Unauthorized possession or use of, loss of, or damage to records, state property or property of others.

B8. Refusal to undergo a search of person or property.

B9. Failure to report to work as scheduled without proper notification of supervisor.

B10. Refusal to work required overtime.

B11. Reporting for duty while under the influence of intoxicants or other drugs; unauthorized possession of intoxicants or drugs on state-owned or leased property or while in state vehicles.

B12. Arrest and conviction for public intoxication, driving under the influence, or associated offenses while on or off duty.

B13. Discrimination against an employee or applicant because of

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race, religion, sex, national origin, age, handicapping condition, or any reprisal action taken against an employee for filing a discrimination complaint or grievance.

B14. Acceptance of any gift or favor from a current juvenile resident, former juvenile resident, their families or friends.

B15. Giving or offering an unauthorized article or favor to any current juvenile resident, former juvenile resident, their families or friends.

B16. Intentional violations of rules governing searches.

B17. Unauthorized dissemination of official information which could breach the security of the facility or disrupt its orderly operation.

B18. Use of official information for private advantage.

B19. Denial of official information to an authorized official.

B20. Unprofessional treatment of juvenile residents contrary to Division policy, staff notice, court order, or Division philosophy.

B21. Gambling or unlawful betting, or the promotion of gambling, on state-owned or leased property.

B22. Sleeping during working hours while at non-security post.

B23. Other actions of similar nature and gravity.

C. Class C Offenses

First Offense - Sixteen (16) day suspension to a thirty (30) day suspension.

Second Offense - Thirty-One (31) day suspension to a six (6) month suspension.

Third Offense - Dismissal.

C1. Refusal to cooperate in any official state inquiry or investigation, including a refusal to answer work-related questions or attempting to influence others involved in an inquiry or investigation.

C2. Unauthorized absence in excess of three (3) consecutive days.

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APPENDIX A

State of West Virginia

DIVISION OF JUVENILE SERVICES

Bob Wise
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Cabinet Secretary
Manfred G. Holland
Director

West Virginia Industrial Home for Youth
7 Industrial Boulevard Industrial, WV 26375
304.782.2371 304.782.4285 fax

Alvin Ross
Facility Superintendent

WEST VIRGINIA DIVISION OF JUVENILE SERVICES

CONFIDENTIALITY STATEMENT

Every employee of the West Virginia Division of Juvenile Services shall ensure the confidentiality of all residents' case records and residents' identity. Employees shall not disclose or knowingly permit the disclosure of any information pertaining to any resident to anyone without authorization from their Facility Superintendent/Director.

Releasing any resident information without official authorization is a violation of WV State Code 49-5-17 and Policy Directive 4.01 Employee Standards of Conduct and Performance. Violation shall result in disciplinary action in accordance with Policy Directive 4.01.

I, [signature], certify I have read and understand the West Virginia Division of Juvenile Services Confidentiality Statement.

[signature] 8/20/02
Staff Signature Date

[signature] 8/20/02
Witnessing Signature Date

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APPENDIX B

Transforming Lives Through Education

WEST VIRGINIA DEPARTMENT OF EDUCATION AT **WV INDUSTRIAL HOME FOR YOUTH**

An Education Program
Accredited by the Correctional Education Association

15 Industrial Blvd., Industrial WV 26375
Telephone:(304) 782-1128 FAX: (304) 782-1379

August 26, 2002

Dear Ms. Hinterer:

This letter is in response to your request to acquire data from the educational records at Johnston High School for the purpose of completing your Masters thesis.

As a State Department of Education employee, you are required to uphold all policies as directed in the Employee Handbook. Your signature witnessing that you have read and agree to abide by this handbook and the policies for which it represents is sufficient for you to have clearance to complete your research at the school. I have confidence in your professionalism and in your understanding of the rights of confidentiality of our student population.

Sincerely,

Robert Daquilante

Robert Daquilante, Principal

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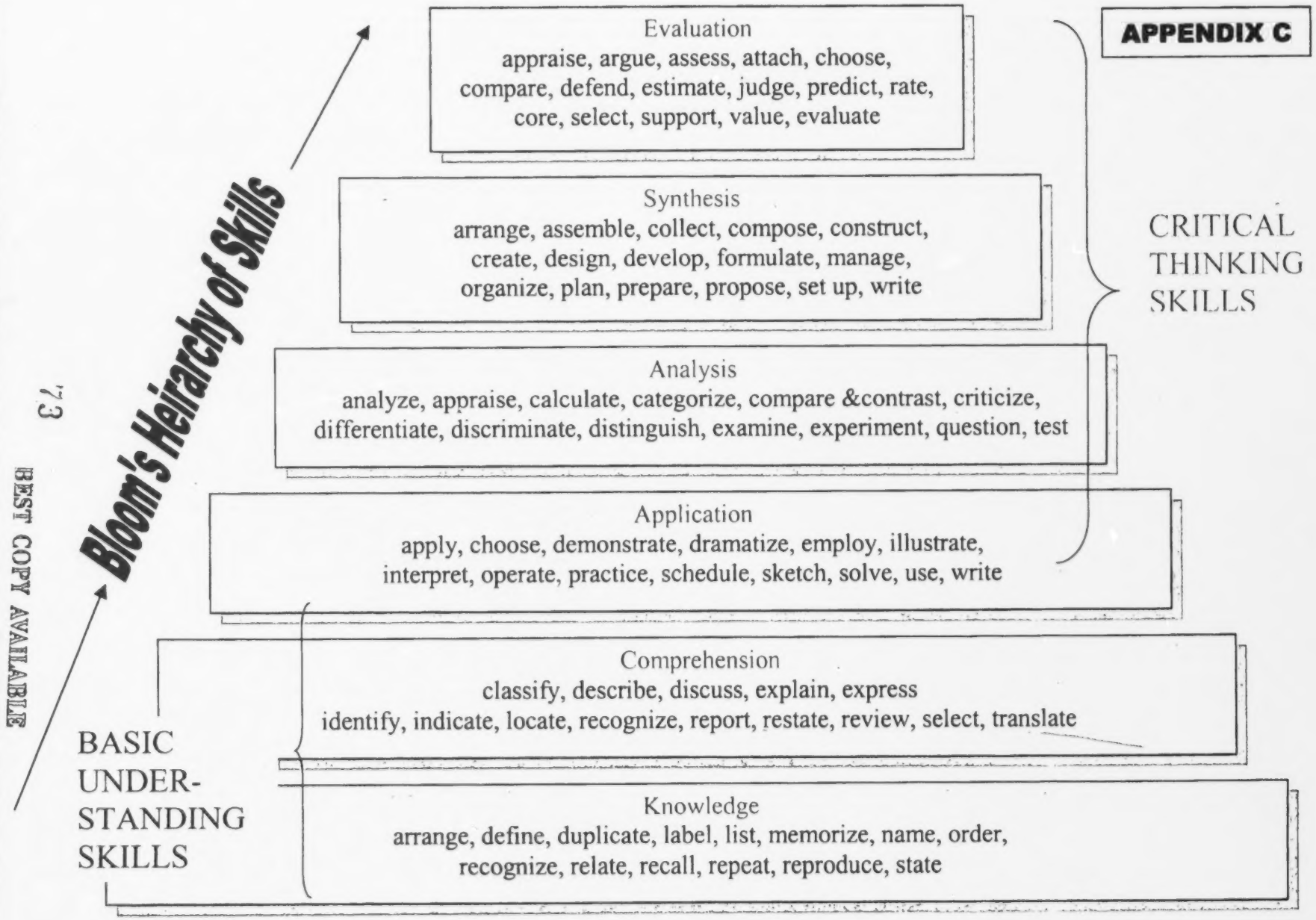
APPENDIX C


Bloom's Heirarchy of Skills
Evaluation
appraise, argue, assess, attach, choose, compare, defend, estimate, judge, predict, rate, core, select, support, value, evaluate
Synthesis
arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, set up, write
Analysis
analyze, appraise, calculate, categorize, compare &contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test
Application
apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write
Comprehension
classify, describe, discuss, explain, express identify, indicate, locate, recognize, report, restate, review, select, translate
Knowledge
arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, reproduce, state
CRITICAL THINKING SKILLS
BASIC UNDER-STANDING SKILLS

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APPENDIX D

GED DATA PRIOR TO 2002

				PRE-GED						POST GED		
ID	WRITING	SOC ST	SCIENCE	LIT & ART	MATH	COMP	WRITING	SOC ST	SCIENCE	LIT & ART	MATH	COMP
A	36	56	51	61	54	52	52	51	50	54	46	50
B	50	49	49	49	49	49	53	60	59	54	52	55
C	44	50	49	39	45	45	48	61	51	57	47	52
D	21	24	25	32	31	27	48	59	51	50	54	52
E	38	48	55	53	43	47	53	62	58	54	51	55
F	36	48	50	46	50	46	52	58	53	56	51	54
G	40	49	51	46	54	48	50	54	49	52	53	51
H	62	59	63	61	63	62	56	54	57	52	53	54
I	47	48	50	43	47	47	48	60	52	48	43	50
J	38	45	50	50	49	47	50	53	58	48	57	53
K	38	47	50	46	53	47	54	53	57	52	61	47
L	26	28	32	20	23	26	48	45	52	43	47	53
M	33	47	50	48	47	45	46	56	51	58	47	51
N	36	39	35	41	38	38	48	54	51	52	52	51
O	39	45	34	53	58	46	50	50	61	63	62	59
P	41	46	54	47	48	47	44	51	55	50	50	50
Q	41	45	37	43	44	42	47	51	52	52	48	50
R	34	40	40	35	48	41	59	52	47	51	52	52
S	50	53	53	54	52	52	47	45	56	55	49	50
T	36	46	51	53	52	48	59	53	52	60	52	55

A sample size of 20 was used for this study

Critical Score 2.093 (.95 CI)

1.725 (.90 CI)

Prepared by Sally Ann Hinterer Fall 2002

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APPENDIX E

Data from Prior GED Tests

ID	PRE-GED WRITING	POST GED WRITING	Difference	PRE-GED LIT & ART	POST GED LIT & ART	Difference
A	36	52	16	61	54	-7
B	50	53	3	49	54	5
C	44	48	4	39	57	18
D	21	48	27	32	50	18
E	38	53	15	53	54	1
F	36	52	16	46	56	10
G	40	50	10	46	52	6
H	62	56	6	61	52	-9
I	47	48	1	43	48	5
J	38	50	12	50	48	-2
K	38	54	16	46	52	6
L	26	48	22	20	43	23
M	33	46	13	48	58	10
N	36	48	12	41	52	11
O	39	50	11	53	63	10
P	41	44	3	47	50	3
Q	41	47	6	43	52	9
R	34	59	25	35	51	10
S	50	47	-3	54	55	1
T	36	59	23	53	60	7
	Pre-Mean	Post Mean	Mean	Pre-Mean	Post Mean	Mean
	39	51	12	46	53	20
	Gain of	12		Gain of	7	
	s value =	8.15		s value =	15.7	
	t test =	6.585 (.95 CI)		t test =	5.690 (.95 CI)	

Prepared by Sally Ann Hinterer Fall 2002

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APPENDIX E

Data from Prior GED Tests

	PRE-GED	POST GED			PRE-GED	POST GED		
ID	SOC ST	SOC ST	Difference		SCIENCE	SCIENCE	Difference	
A	56	51	5		51	50	-1	
B	49	60	11		49	59	10	
C	50	61	11		49	51	3	
D	24	59	35		25	51	26	
E	48	62	14		55	58	3	
F	48	58	10		50	53	3	
G	49	54	5		51	49	-2	
H	59	54	-5		63	57	-6	
I	48	60	12		50	52	2	
J	45	53	8		50	58	8	
K	47	53	6		50	57	7	
L	28	45	17		32	52	20	
M	47	56	9		50	51	1	
N	39	54	15		35	51	16	
O	45	50	5		34	61	27	
P	46	51	5		54	55	1	
Q	45	51	6		37	52	25	
R	40	52	12		40	47	7	
S	53	45	-8		53	56	3	
T	46	53	7		51	52	1	
	Pre-Mean	Post Mean	Mean		Pre-Mean	Post Mean	Mean	
	46	54	9		46	54	7.7	
	Gain of	8			Gain of	8		
	s value =	8.6			s value =	9.6		
	t test =	4.672			t test =	3.584		

Prepared by Sally Ann Hinterer Fall 2002

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APPENDIX E

Data from Prior GED Tests

ID	PRE-GED MATH	POST GED MATH	Difference
A	54	46	-8
B	49	52	3
C	45	47	2
D	31	54	23
E	43	51	8
F	50	51	1
G	54	53	-1
H	63	53	-10
I	47	43	-4
J	49	57	8
K	53	61	9
L	23	47	14
M	47	47	0
N	38	52	14
O	58	62	4
P	48	50	2
Q	44	48	4
R	48	52	4
S	52	49	-3
T	52	52	0
	Pre-Mean	Post Mean	Mean
	47	51	6.1
	Gain of	4	
	s value =	7.749	
	t test =	2.020	

PRE-GED COMP	POST GED COMP	Difference
52	50	-2
49	55	6
45	52	7
27	52	25
47	55	8
46	54	8
48	51	3
62	54	-8
47	50	3
47	53	6
47	47	0
26	53	27
45	51	6
38	51	13
46	59	13
47	50	3
42	50	8
41	52	11
52	50	2
48	55	7
Pre-Mean	Post Mean	Mean
45	52	7.3
Gain of	7	
s value =	6.78	
t test =	4.815	

Prepared by Sally Ann Hinterer Fall 2002

APPENDIX F

GED 2002 DATA TOTALS

				PRE-GED					POST GED			
ID	WRITING	SOC ST	SCIENCE	LIT & ART	MATH	COMP	WRITING	SOC ST	SCIENCE	LIT & ART	MATH	COMP
A	500	530	530	540	520	520	470	450	560	550	490	504
B	390	450	340	530	580	460	503	600	610	630	620	592
C	410	460	540	470	480	470	440	510	550	500	510	502
D	360	460	510	530	520	480	590	530	520	600	530	554
E	340	400	400	340	480	490	590	520	470	510	520	522
F	410	450	370	430	440	420	470	510	520	520	480	500
G	410	550	420	510	520	480	430	590	520	520	550	520
H	300	380	390	310	470	370	460	550	530	570	450	512
I	490	440	470	560	450	480	510	480	530	570	540	526
J	390	490	470	500	450	460	500	520	530	520	440	502
K	340	530	530	550	410	470	430	500	550	500	460	490
L	440	530	490	650	610	544	530	550	560	570	530	548
M	370	410	510	430	430	430	540	520	540	500	530	526
N	350	400	460	480	310	400	440	500	480	500	500	484
O	310	490	390	510	410	420	540	490	540	580	440	518
P	390	450	340	530	580	460	500	600	610	630	620	592
Q	230	590	390	480	200	380	520	800	690	530	620	632

A sample size of 17 students was used for this study

Critical Score 2.120 (.95 CI)

1.746 (.90 CI)

Prepared by Sally Ann Hinterer Fall 2002

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APPENDIX G

COMPARISON DATA FOR GED 2002

ID	PRE-GED WRITING	POST-GED WRITING	Difference		PRE-GED LIT & ART	POST-GED LIT & ART	Difference
A	500	470	-30		540	550	10
B	390	503	113		530	630	100
C	10	440	30		470	500	30
D	360	590	230		530	600	70
E	340	590	250		340	510	170
F	410	470	60		430	520	90
G	410	430	20		510	520	10
H	300	460	160		310	570	260
I	490	510	20		560	570	10
J	390	500	110		500	520	20
K	340	430	90		550	500	-50
L	440	530	90		650	570	-80
M	370	540	170		430	500	70
N	350	440	90		480	500	20
O	310	540	230		510	580	70
P	390	500	110		530	630	100
Q	230	520	290		480	530	50
	Pre-Mean	Post Mean	Mean		Pre-Mean	Post Mean	Mean
	378	498	120		488	543	56
	Gain of	101			Gain of	55	
	s value =	91.26			s value =	78.96	
	t test =	5.422			t test =	2.924	

Prepared by Sally Ann Hinterer Fall 2002

APPENDIX G

COMPARISON DATA FOR GED 2002

	PRE-GED	POST-GED			PRE-GED	POST-GED		
ID	SCIENCE	SCIENCE	Difference		SOC ST	SOC ST	Difference	
A	530	560	30		530	450	-80	
B	340	610	270		450	600	150	
C	540	550	10		460	510	50	
D	510	520	10		460	530	70	
E	400	470	70		400	520	120	
F	370	520	150		450	510	60	
G	420	520	100		550	590	40	
H	390	530	140		380	550	170	
I	470	530	60		440	480	40	
J	470	530	60		490	520	30	
K	530	550	20		530	500	30	
L	490	560	70		530	550	20	
M	510	540	30		410	520	110	
N	460	480	20		400	500	100	
O	390	540	50		490	490	0	
P	340	610	270		450	600	150	
Q	390	690	300		590	800	210	
	Pre Mean	Post Mean	Mean		Pre-Mean	Post Mean	Mean	
	459	548	98		471	542	75	
	Gain of	79			Gain of	71		
	s value =	96.2			s value =	70.887		
	t test =	4.2			t test =	4.232		

Prepared by Sally Ann Hinterer Fall 2002

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APPENDIX G

COMPARISON DATA FOR GED 2002

ID	PRE-GED MATH	POST-GED MATH	Difference		PRE-GED COMP	POST-GED COMP	Difference
A	520	490	-30		520	504	16
B	580	620	40		460	592	132
C	480	510	30		470	502	32
D	520	530	10		480	554	74
E	480	520	40		490	522	32
F	440	480	40		420	500	80
G	520	550	30		480	520	40
H	470	450	-20		370	512	42
I	450	540	90		480	526	46
J	450	440	-10		460	502	42
K	410	460	50		470	490	20
L	610	530	-80		544	548	4
M	430	530	100		430	526	96
N	310	500	190		400	484	
O	410	440	30		420	518	
P	580	620	40		460	592	
Q	200	620	420		380	632	
	Pre-Mean	Post Mean	Mean		Pre-Mean	Post Mean	Mean
	489	512	57		467	531	70
	Gain of	23			Gain of	64	
	s value =	109.679			s value =	39.386	
	t test =	2.143			t test =	7.328	

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APPENDIX H

ACT Data Totals

ID	Pre-English	Pre-Math	Pre-Reading	Pre-Science	Pre-Comp	Post English	Post Math	Post Reading	Post Science	Post-Comp
A	8	16	15	11	13	15	15	14	15	15
B	7	16	13	19	14	24	19	26	24	23
C	16	13	20	21	17	16	19	19	17	18
D	20	20	21	18	20	21	19	21	23	21
E	15	14	20	22	18	21	18	23	22	21
F	16	15	11	10	13	18	14	17	9	15
G	18	13	14	13	15	15	16	14	19	16
H	22	15	21	22	20	20	17	20	22	20
I	16	11	14	21	16	21	23	25	25	24
J	12	15	13	14	14	20	16	18	12	17
K	21	18	16	9	16	16	18	17	19	18
L	5	14	10	10	10	19	15	19	13	17
M	12	13	21	24	18	24	19	23	23	22
N	23	27	29	31	28	26	29	26	26	27
O	8	14	22	11	14	17	18	16	16	17
P	26	15	27	25	23	22	20	19	23	21
Q	8	10	10	15	11	14	16	19	18	17
	20	14	18	22	19	23	17	26	24	23
S	19	16	15	14	16	21	17	23	16	19
T	16	13	16	15	16	15	17	13	11	14
U	14	20	28	24	22	15	18	23	21	19
V	19	19	19	22	20	21	19	22	20	21
W	16	15	16	15	16	21	17	19	17	19
X	8	14	16	10	12	16	18	20	18	19
Y	18	14	16	18	17	23	16	22	20	20
Z	16	15	18	23	18	22	18	20	24	21
AA	15	15	20	16	16	14	15	20	20	18
A sample size of 27 was used for this study										
Critical Score	2.056 (.95)									
	1.706 (.90)									

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APPENDIX I

ACT COMPARISON DATA

ID	Pre-English	Post English	Difference
A	8	15	7
B	7	24	13
C	16	16	0
D	20	21	1
E	15	21	6
F	16	18	2
G	18	15	-3
H	22	20	-2
I	16	21	5
J	12	20	8
K	21	16	-5
L	5	19	14
M	12	24	12
N	23	26	3
O	8	17	11
P	26	22	-4
Q	8	14	6
R	20	23	3
S	19	21	3
T	16	15	1
U	14	15	1
V	19	21	2
W	16	21	5
X	8	16	8
Y	18	23	5
Z	16	22	6
AA	15	14	-1
	Pre-Mean	Post Mean	Mean
	15	19	4
	Gain of	4	
	s value =	5.33	
	t test =	3.899	

Pre-Math	Post Math	Difference
16	15	1
16	19	3
13	19	6
20	19	-1
14	18	4
15	14	-1
13	16	3
15	17	2
11	23	12
15	16	1
18	18	0
14	15	1
13	19	6
27	29	2
14	18	4
15	20	5
10	16	4
14	17	3
16	17	1
13	17	4
20	18	-2
19	19	0
15	17	2
14	18	4
14	16	2
15	18	3
15	15	0
Pre-Mean	Post Mean	Mean
15	18	1.48
Gain of	3	
s value =	3.022	
t test =	2.545	

ID	Pre-Reading	Post Reading
A	15	14
B	13	26
C	20	19
D	21	21
E	20	23
F	11	17
G	14	14
H	21	20
I	14	25
J	13	18
K	16	17
L	10	19
M	21	23
N	29	26
O	22	16
P	27	19
Q	10	19
R	18	26
S	15	23
T	16	13
U	28	23
V	19	22
W	16	19
X	16	20
Y	16	22
Z	18	20
AA	20	20
Pre-Mean	Post Mean	
18	20	
Gain of	2	
s value =	4.8	
t test =	3.41	

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APPENDIX I

ACT COMPARISON DATA

Difference		Pre-Science	Post Science	Difference		Pre-Comp	Post-Comp	Difference
-1		11	15	4		13	15	2
13		19	24	5		14	23	9
1		21	17	-4		17	18	1
0		18	23	5		20	21	1
3		22	22	0		18	21	3
6		10	9	-1		13	15	2
0		13	19	6		15	16	1
1		22	22	0		20	20	0
11		21	25	4		16	24	8
5		14	12	-2		14	17	3
1		9	19	10		16	18	2
9		10	13	3		10	17	7
2		24	23	-1		18	22	4
3		31	26	-5		28	27	1
-6		11	16	5		14	17	3
-8		25	23	-3		23	21	2
9		15	18	3		11	17	6
8		22	24	2		19	23	4
8		14	16	2		16	19	3
-3		15	11	-4		16	14	-2
5		24	21	-3		22	19	3
3		22	20	-2		20	21	1
3		15	17	2		16	19	3
4		10	18	2		12	19	7
6		18	20	2		17	20	3
2		23	24	1		18	21	3
0		16	20	4		16	18	2
Mean		Pre-Mean	Post Mean	Mean		Pre-Mean	Post Mean	Mean
1.48		18	19	1.3		17	19	3
		Gain of	1			Gain of	2	
		s value =	3.56			s value =	2.56	
		t test =	1.892			t test =	6.089	

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